

550, 341

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 October 2004 (07.10.2004)

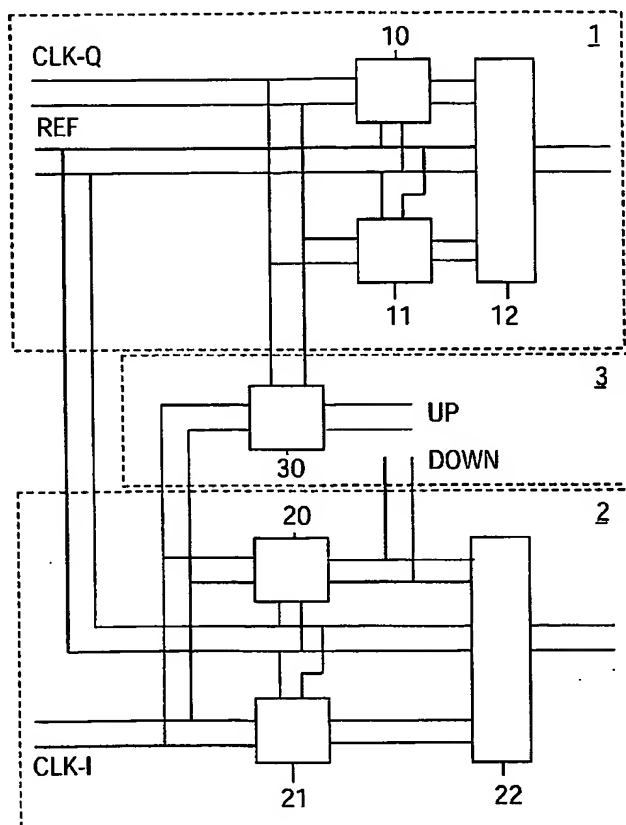
PCT

(10) International Publication Number
WO 2004/086604 A1

- (51) International Patent Classification⁷: **H03D 13/00**,
H03L 7/089
- (21) International Application Number:
PCT/IB2004/050313
- (22) International Filing Date: 22 March 2004 (22.03.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
03100828.7 28 March 2003 (28.03.2003) EP
- (71) Applicant (for all designated States except US): **KONIN-
KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]**;
Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): **SANDULEANU, Mi-
hai, A., T. [NL/NL]**; c/o Prof. Holstlaan 6, NL-5656 AA
Eindhoven (NL).
- (74) Agent: **DUIJVESTIJN, Adrianus, J.**; Prof. Holstlaan 6,
NL-5656 AA Eindhoven (NL).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.
- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): **ARIPO (BW, GH,**

[Continued on next page]

(54) Title: **FAST LINEAR PHASE DETECTOR**



(57) Abstract: Linear phase detectors comprising circuits (1,2) receiving reference signals (REF) and first and second clock signals (CLK-Q, CLK-I) for generating first and second (phase) control signals (UP,DOWN) for use in multiplier circuits, demodulators and receivers, have large delays due to long path lengths and many operations between input and output (insight). They can be made faster by providing each circuit (1,2) with two parallel latches (10,11,20,21) and a multiplexer (12,22) for multiplexing latch output signals (basic idea). Said multiplexers generate (frequency control) signals to be supplied to frequency detectors, with a third circuit (3) generating at least one of said (phase) control signals (UP,DOWN). Said third circuit (3) comprises a latch (30) generating said first (phase) control signal (UP), with one of the latches (20) of the second circuit (2) generating the second (phase) control signal (DOWN). Or said third circuit (3) comprises logical circuitry (31-34) comprising four EXOR gates (31-34). A fifth EXOR gate (35) is used for balancing the third circuit (3).

WO 2004/086604 A1



GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Declaration under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM,

Published:

- with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.